

See MPEP Section 904.02(a). Accordingly, in applicants' view, the "final" status of the Office Action of March 12, 2003 appears to be premature.

Applicants respectfully traverse the rejection based on newly cited Tanaka. Tanaka et al. do not provide written description of the subject matter of the claims, allegedly under final rejection or the claims presented herein. With respect to amended claims, Tanaka et al. does not show a buffer layer and the other two cited references do not show a buffer layer of a hexagonal crystal system. Moreover, Tanaka et al does not provide enablement of the claims, cf. MPEP Section 2131.

Applicants seeks to provide a quartz film of high purity. This is emphasized in Claims 23 et seq. The product of Tanaka et al. claims contains germanium dioxide and trace amounts of alkali metals; and those contaminants are recited in the Tanaka claims. However, in applicants' product, HCl which can used as a catalyst does not remain in the quartz. Therefore, applicants' product is pure quartz.

With respect to U.S. PTO allegations concerning method of production issues, the applicants' method of making product is simpler than the methods disclosed in the cited references. In Item 4 of the Office Action, the U.S. PTO states Tanaka et al. discloses a vapor phase deposition for producing a thin film of silicon dioxide having a quartz crystal structure at atmospheric pressure using metal alkoxide. In fact, Tanaka et al. states that the pressure in the chamber is preferably from 0.01 Torr to atmospheric pressure. If the pressure is less than 0.01 Torr, the crystal growth is too slow for practical use according to Tanaka. A CVD process under a pressure exceeding atmospheric pressure requires a very expensive system, as Tanaka states at Column 7, lines 35-39. In applicants' view, the Tanaka et al. statements concerning production methods are too general and the

examples relating to CVD or method using vacuum chamber (e.g. EXAMPLES 6-9) all require high vacuum; that express disclosure does not enable a person of ordinary skill to repeat applicants' product and process. Please refer to EXAMPLE 6 (Column 12, lines 5-6), EXAMPLE 7 (Column 12, lines 37-41) and EXAMPLE 8 (Column 12, lines 56-60). EXAMPLE 9 relates to a laser ablation process show specific vacuum pressure, 0.03 Torr (Column 13, lines 25-28). In addition, as stated on lines 9-16 on page 2 of our original specification the laser ablation method requires very high vacuum. Therefore, the CVD method to deposit SiO₂ at atmospheric pressure is not described by Tanaka et al.

It is believed that in the CVD process depressurization is necessary and a sol-gel method such as shown in Tanaka et al. is different from that of CVD.

Thus, Tanaka et al. do not provide written description of the subject matter of the claims allegedly under final rejection or the claims presented herein.

Applicants respectfully traverse the rejection in Item 6 of the Office Action Okano et al. uses two buffer layers to prevent warpage. On one of the layers, quartz glass is deposited. However, Okano et al. does not show epitaxially grown quartz; their quartz glass is amorphous. Applicants' single buffer layer which is composed of a structured hexagonal system such as GaN or ZnO is used to grow quartz without dislocation. The inventions of Okano et al. and Tokunaga et al. relate to an optical waveguide and they do not relate to quartz for oscillation. Moreover, there are no suggestions or implications to use those buffer layers to obtain quartz without dislocations.

Applicants respectfully traverse the rejections in Item 8 of the Office Action. The U.S. PTO states that Okano et al. and Tokunaga et al. shows a thin film of quartz,

however, that film is a layer of amorphous quartz glass. Such a component is irrelevant to the claims pending herein.

In applicants' view, the secondary references do not make up for the deficiencies of Tanaka et al:

To establish a *prima facie* case of obviousness, three basic criteria must be met.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

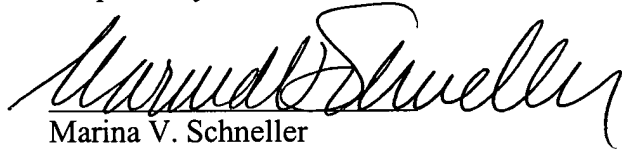
Second, there must be a reasonable expectation of success.

Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). [Emphasis added]

Withdrawal of the rejections under 35 USC 103, reconsideration and an early allowance are respectfully solicited.

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Respectfully submitted,



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MARKED UP VERSION OF CLAIM AMENDMENTS

1. (Amended) A quartz thin film made by depositing at least one silicon alkoxide selected from the group consisting of tetramethoxysilane, tetraethoxysilane, [tetrapropoxysilane] tetrapropoxysilane and tetrabutoxysilane on a substrate under atmospheric pressure,

wherein a buffer layer is disposed between the quartz thin film and the substrate; and

wherein the quartz thin film is a quartz epitaxial thin film; and

wherein the buffer layer comprises hexagonal system crystal phase .

8. (Amended) The article of Claim [2] 1 wherein said epitaxial layer is characterized by an X-ray diffraction profile exhibiting a diffraction peak at $2\theta=50.6^\circ$.

10. (Amended) The article of Claim [9]1, wherein the buffer layer is GaN or ZnO

14. (Amended) An article comprising a quartz thin film grown on a substrate under atmospheric pressure,

wherein the quartz thin film comprises a deposit formed from at least one silicon alkoxide selected from the group consisting of tetramethoxysilane, tetraethoxysilane, [tetrapropoxysilane] tetrapropoxysilane and tetrabutoxysilane; [and]

wherein the substrate comprises a material selected from the group consisting of sapphire, silicon, and GaAs; and

a buffer layer

wherein the buffer layer is disposed between said substrate and said quartz thin film and

wherein said buffer layer comprises a hexagonal system crystal phase. --

16. (Amended) The article of Claim [15] 14, wherein the buffer layer is GaN or ZnO.

18. (Amended) [An] The article of Claim 14, wherein the substrate comprises sapphire.

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